CLAIMS

1. Method for continuously and dynamically mixing at least two fluids, comprising the following steps:

a) driving in rotation the rotor (1) of a micromixer comprising:

- a rotor (1) comprising a shaft (2) equipped with blades (3) distributed in groups (3a-3g), the blades (3) of each group (3a-3g) being arranged around the shaft (2) in the same plane perpendicular to the longitudinal axis of the shaft (2), and the groups (3a-3g) of blades (3) being spaced out from each other along the longitudinal axis of the shaft (2);
- a stator (4) in the form of a hollow cylinder which is able to receive the rotor (1), this stator (4) comprising, at one end of its longitudinal axis, at least one inlet (5) for a first fluid, at least one inlet (6) for a second fluid and, at the other end of its longitudinal axis, an outlet (7) for the micromixture of the fluids;

b) introducing the fluids into the micromixer; and

c) recovering at the outlet (7) of the micromixer a micromixture of the fluids.

2. Method according to claim 1, characterized in that the rotor (1) is driven in rotation at a speed equal to 30,000 r.p.m. at most and preferably greater than 5000 r.p.m. and less than 20,000 r.p.m.

3. Method according to claim 1 or claim 2, characterized in that the first and second fluids are introduced in at least two places (5, 6) diametrically opposed with respect to the axis of the rotor (1).

4. Method according to one of claims 1 to 3, characterized in that it is used with a fluid temperature comprised between -100°C and 300°C and preferably comprised between -80°C and 110°C.

5. Method according to one of claims 1 to 4, characterized in that it is implemented with fluid pressures comprised between 0.1 and 100 bars absolute and preferably comprised between 1 and 50 bars absolute.

6. Method according to one of claims 1 to 5, characterized in that the fluids are introduced into the mixer at a flow rate between 1 g/h and 10,000 kg/h and preferably between 1 kg/h and 5,000 kg/h.

7. Method according to one of claims 1 to 6, characterized in that the ratio of the mass flow rates is comprised between 0,01 and 100, preferably between 0.1 and 10.

8. Method according to one of claims 1 to 7, characterized in that the fluids have a viscosity comprised between 1 mPa.s and 10^3 Pa.s and preferably comprised between 10 mPa.s and 10 Pa.s.

9. Method according to one of claims 1 to 8, characterized in that it is implemented with residence times of the fluids in the micromixer greater than 1 ms, and preferably, comprised between 5 ms and 10 s.

10. Method according to one of claims 1 to 9, characterized in that the fluids are reactive fluids.

11. Method according to claim 10, characterized in that the fluids are liquids which produce anionic polymerization reactions.

12. Method according to claim 11, characterized in that at least one of the fluids comprises at least one (meth)acrylic monomer.

13. Method according to claim 12, characterized in that the (meth)acrylic monomer is chosen from the group constituted by acrylic anhydride, methacrylic anhydride, acrylates of methyl, ethyl, propyl, n- and tert-butyl, ethylhexyl, nonyl, 2-dimethyl amino ethyl and methacrylates of methyl, ethyl, propyl and n- and tert-butyl, ethylhexyl, nonyl and 2-dimethyl amino ethyl.

14. Polymerization method, comprising the following steps:

(i) driving in rotation the rotor (1) of a micromixer comprising:

- a rotor (1) comprising a shaft (2) equipped with blades (3) distributed in groups (3a-3g), the blades (3) of each group (3a-3g) being arranged around the shaft (2) in the same plane perpendicular to the longitudinal axis of the shaft (2), and the groups (3a-3g) of blades (3) being spaced out from each other along the longitudinal axis of the shaft (2);
- a stator (4) in the form of a hollow cylinder which is able to receive the rotor (1), this stator (4) comprising, at one end of its longitudinal axis, at least one inlet (5) for a first fluid, at least one inlet (6) for a second fluid and, at the other end of its longitudinal axis, an outlet (7) for the micromixture of the fluids;

(ii) introduction of at least two fluids, at least one of which is reactive, into the micromixer;

(iii) recovery at the outlet (7) of the micromixer of a micromixture of the fluids;

(iv) polymerization of the reactive fluid or fluids, this polymerization being able to occur outside the micromixer or begin inside this micromixer and continue outside this micromixer.

15. Polymerization method according to claim 14, in which at least one of the fluids comprises at least one (meth)acrylic monomer.

16. Polymerization method according to claim 15, characterized in that the (meth)acrylic monomer is chosen from the group constituted by acrylic anhydride, methacrylic anhydride, acrylates of methyl, ethyl, propyl, n- and tert-butyl, ethylhexyl, nonyl, 2-dimethyl amino ethyl and methacrylates of methyl, ethyl, propyl and n- and tert-butyl, ethylhexyl, nonyl and 2-dimethyl amino ethyl.

17. Micromixer comprising:

- a rotor (1) comprising a shaft (2) equipped with blades (3) distributed in groups (3a-3g), the blades (3) of each group (3a-3g) being arranged around the shaft (2) in the same plane perpendicular to the longitudinal axis of the shaft (2), and the groups (3a-3g) of blades (3) being spaced out from each other along the longitudinal axis of the shaft (2); and
- a stator (4) approximately in the form of a hollow cylinder which is able to receive the rotor (1), this stator (4) comprising, at one end of its longitudinal axis, at least one inlet (5) for a first fluid, at least

one inlet (6) for a second fluid and, at the other end of its longitudinal axis, an outlet (7) for the micromixture of the fluids;

18. Micromixer according to claim 17, characterized in that the stator (4) also comprises a plurality of disks (8), these disks (8) being stacked and arranged inside the stator (4), each disk having in its centre a recess (9) housing a group (3a-3g) of blades (3).

19. Micromixer according to claim 18, characterized in that the recess (9) of each disk (8) has the shape of a circular hole, one part of which is occupied by extensions of the disk (8) forming counter-blades (10).

20. Micromixer according to claim 19, characterized in that the counter-blades (10) of the disks (8) have the same shape and the same dimensions as the blades (3) of the rotor (1) and have a thickness less than that of the body (12) of the disk (8).

21. Micromixer according to one of claims 17 to 20, characterized in that the inlets (5, 6) of the stator are diametrically opposed.

22. Micromixer according to one of claims 17 to 21, characterized in that it also comprises a fluid distributor 17 in the form of a washer, this distributor (17) comprising at least one inlet for a first fluid and at least one inlet for a second fluid, these inlets communicating respectively with the inlets (5, 6) of the stator (4).